Montana Department of
ENVIRONMENTAL QUALITY
Brian Schweitzer, Governor
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PRELIMINARY DETERMINATION
ON PERMIT APPLICATION

Date of Mailing: August 20, 2008

Name of Applicant: Flathead Electric LFGE Facility

Source: Electric Power Production

Proposed Action: The Department of Environmental Quality (Department) proposes to issue a permit, with conditions, to the above-named applicant. The application was assigned Permit Application Number 4245-00.

Proposed Conditions: See attached.

Public Comment: Any member of the public desiring to comment must submit such comments in writing to the Air Resources Management Bureau (Bureau) of the Department at the above address. Comments may address the Department's analysis and determination, or the information submitted in the application. In order to be considered, comments on this Preliminary Determination are due by September 4, 2008. Copies of the application and the Department's analysis may be inspected at the Bureau's office in Helena. For more information, you may contact the Department.

Departmental Action: The Department intends to make a decision on the application after expiration of the Public Comment period described above. A copy of the decision may be obtained at the above address. The permit shall become final on the date stated in the Department's Decision on this permit, unless an appeal is filed with the Board of Environmental Review (Board).

Procedures for Appeal: Any person jointly or severally adversely affected by the final action may request a hearing before the Board. Any appeal must be filed by the date stated in the Department's Decision on this permit. The request for a hearing shall contain an affidavit setting forth the grounds for the request. Any hearing will be held under the provisions of the Montana Administrative Procedures Act. Submit requests for a hearing in triplicate to: Chairman, Board of Environmental Review, P.O. Box 200901, Helena, MT 59620.

For the Department,

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VW:JM
Enclosures

MONTANA AIR QUALITY PERMIT

Issued To: Flathead Electric LFGE Facility
4098 Highway 93 North
Kalispell, MT 59901

Permit: #4245-00
Application Complete: 07/14/08
Preliminary Determination Issued: 08/20/08
Department's Decision Issued:
Permit Final:
AFS #: 029-0033

An air quality permit, with conditions, is hereby granted to the Flathead Electric Landfill Gas to Energy (Flathead LFGE) facility, pursuant to Sections 75-2-204 and 211 of the Montana Code Annotated (MCA), as amended, and Administrative Rules of Montana (ARM) 17.8.740, *et seq*., as amended, for the following:

SECTION I: Permitted Facilities

A. Permitted Equipment

The Flathead LFGE facility will incorporate a single Caterpillar G3520C engine/generator. The engine/generator will be fueled on landfill gas (LFG) produced by, and collected at, the Flathead county Solid Waste District's landfill. If the LFG is not used as a fuel for the engine generator, it would be destroyed in an existing enclosed flare owned and permitted by the Flathead County Solid Waste District. A complete list of equipment is in the permit analysis of this permit.

B. Plant Location

The Flathead LFGE facility will be located at Flathead County Solid Waste District's existing landfill, located at 4098 Highway 93 North. The legal site description is Section 1, Township 29 North, Range 22 West, in Flathead County.

SECTION II: Conditions and Limitations

A. Emission Limitations

1. Emissions from the LFG-fired engine/generator shall not exceed the following limits, on a grams per brake-horsepower hour (g/bhp-hr) basis. All limits are based on a 3-hour rolling average (ARM 17.8.752):

| | |
|---|---|
| Oxides of Nitrogen ($NO_x$): | 0.5 g/bhp-hr |
| Carbon Monoxide (CO) (100 percent (%) output) | 2.75 g/bhp-hr |
| CO (50% output) | 3.0 g/bhp-hr |
| Volatile Organic Compounds (VOC) (100% output): | 0.7 g/bhp-hr |
| VOC (50% output) | 0.9 g/bhp-hr |
| Particulate matter with an aerodynamic diameter of 10 microns or less ($PM_{10}$): | 0.1 g/bhp-hr |

2. Flathead LFGE shall not cause or authorize emissions to be discharged into the outdoor atmosphere from any sources installed after November 23, 1968, that exhibit an opacity of 20% or greater averaged over 6 consecutive minutes (ARM 17.8.304).

3. Flathead LFGE shall not cause or authorize the use of any street, road, or parking lot without taking reasonable precautions to control emissions of airborne particulate matter (ARM 17.8.308).

4. Flathead LFGE shall treat all unpaved portions of the haul roads, access roads, parking lots, or general plant area with water and/or chemical dust suppressant as necessary to maintain compliance with the reasonable precautions limitation in Section II.A.3 (ARM 17.8.749).

5. Flathead LFGE shall comply with all applicable standards and limitations, and the reporting, recordkeeping and notification requirements contained in 40 CFR 60, Subpart IIII, *Standards of Performance for Stationary Compression Ignition Internal Combustion Engines*, and 40 CFR 63, Subpart ZZZZ, *National Emissions Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines*, for any applicable engine (ARM 17.8.340 and 40 CFR 60, Subpart IIII, 40 CFR 63, Subpart ZZZZ).

B. Testing Requirements

1. All compliance source tests shall conform to the requirements of the Montana Source Test Protocol and Procedures Manual (ARM 17.8.106).

2. The Department of Environmental Quality (Department) may require further testing (ARM 17.8.105).

C. Operational Reporting Requirements

1. Flathead LFGE shall supply the Department with annual production information for all emission points, as required by the Department in the annual emission inventory request. The request will include, but is not limited to, all sources of emissions identified in the emission inventory contained in the permit analysis.

   Production information shall be gathered on a calendar-year basis and submitted to the Department by the date required in the emission inventory request. Information shall be in the units required by the Department. This information may be used to calculate operating fees, based on actual emissions from the facility, and/or to verify compliance with permit limitations (ARM 17.8.505).

2. Flathead LFGE shall notify the Department of any construction or improvement project conducted, pursuant to ARM 17.8.745, that would include ***the addition of a new emissions unit***, change in control equipment, stack height, stack diameter, stack flow, stack gas temperature, source location, or fuel specifications, or would result in an increase in source capacity above its permitted operation. The notice must be submitted to the Department, in writing, 10 days prior to startup or use of the proposed de minimis change, or as soon as reasonably practicable in the event of an unanticipated circumstance causing the de minimis change, and must include the information requested in ARM 17.8.745(l)(d) (ARM 17.8.745).

3. All records compiled in accordance with this permit must be maintained by Flathead LFGE as a permanent business record for at least 5 years following the date of the measurement, must be available at the plant site for inspection by the Department, and must be submitted to the Department upon request (ARM 17.8.749).

D. Notification

1. Flathead LFGE shall provide the Department with written notification of commencement of construction, including purchase and installation, of the generator/engine within 30 days after commencement of construction (ARM 17.8.749).

2. Flathead LFGE shall provide the Department with written notification of the actual start-up date of the compressor engine within 15 days after the actual start-up date at each location (ARM 17.8.749).

SECTION III: General Conditions

A. Inspection – Flathead LFGE shall allow the Department's representatives access to the source at all reasonable times for the purpose of making inspections or surveys, collecting samples, obtaining data, auditing any monitoring equipment (CEMS, CERMS) or observing any monitoring or testing, and otherwise conducting all necessary functions related to this permit.

B. Waiver – The permit and the terms, conditions, and matters stated herein shall be deemed accepted if Flathead LFGE fails to appeal as indicated below.

C. Compliance with Statutes and Regulations – Nothing in this permit shall be construed as relieving Flathead LFGE of the responsibility for complying with any applicable federal or Montana statute, rule, or standard, except as specifically provided in ARM 17.8.740, *et seq*. (ARM 17.8.756).

D. Enforcement – Violations of limitations, conditions and requirements contained herein may constitute grounds for permit revocation, penalties, or other enforcement action as specified in Section 75-2-401, *et seq*., MCA.

E. Appeals – Any person or persons jointly or severally adversely affected by the Department's decision may request, within 15 days after the Department renders its decision, upon affidavit setting forth the grounds therefor, a hearing before the Board of Environmental Review (Board). A hearing shall be held under the provisions of the Montana Administrative Procedures Act. The filing of a request for a hearing does not stay the Department's decision, unless the Board issues a stay upon receipt of a petition and a finding that a stay is appropriate under Section 75-2-211(11)(b), MCA. The issuance of a stay on a permit by the Board postpones the effective date of the Department's decision until conclusion of the hearing and issuance of a final decision by the Board. If a stay is not issued by the Board, the Department's decision on the application is final 16 days after the Department's decision is made.

F. Permit Inspection – As required by ARM 17.8.755, Inspection of Permit, a copy of the air quality permit shall be made available for inspection by the Department at the location of the source.

G. Permit Fee – Pursuant to Section 75-2-220, MCA, as amended by the 1991 Legislature, failure to pay the annual operation fee by Flathead LFGE may be grounds for revocation of this permit, as required by that section and rules adopted thereunder by the Board.

H. Construction Commencement – Construction must begin within 3 years of permit issuance and proceed with due diligence until the project is complete or the permit shall be revoked (ARM 17.8.762).

Permit Analysis
Flathead Electric LFGE Facility
Permit #4245-00

I. Introduction/Process Description

Flathead Electric owns and operates a landfill gas to energy (Flathead LFGE) facility. The facility is located in Section 1, Township 29 North, Range 22 West, in Flathead County, at Flathead County Solid Waste District's existing landfill.

A. Permitted Equipment

The facility will incorporate the following major components:

- A landfill gas (LFG) pressurization and cooling skid. The purposes of the skid are to raise the pressure of the LFG to a pressure acceptable for use in the engine/generator and to remove moisture from the LFG. The skid will produce about 610 square cubic foot per minute (scfm) of LFG at about 2.5 pounds per square inch guage (psig);

- A 20-cylinder, spark-ignited 2,233 brake horsepower, reciprocating engine/generator. A Caterpillar G3520C will be employed; and

- Conveyors and associated equipment.

B. Source Description

The facility will incorporate a single Caterpillar G3520C engine/generator. The engine/generator will be fueled on LFG produced by, and collected at, the Flathead County Solid Waste District's landfill. If the LFG was not used as a fuel for the engine/generator, it would be destroyed in an existing enclosed flare owned by Flathead County Solid Waste District.

II. Applicable Rules and Regulations

The following are partial explanations of some applicable rules and regulations that apply to the facility. The complete rules are stated in the Administrative Rules of Montana (ARM) and are available, upon request, from the Department of Environmental Quality (Department). Upon request, the Department will provide references for location of complete copies of all applicable rules and regulations or copies where appropriate.

A. ARM 17.8, Subchapter 1 – General Provisions, including but not limited to:

1. ARM 17.8.101 Definitions. This rule includes a list of applicable definitions used in this chapter, unless indicated otherwise in a specific subchapter.

2. ARM 17.8.105 Testing Requirements. Any person or persons responsible for the emission of any air contaminant into the outdoor atmosphere shall, upon written request of the Department, provide the facilities and necessary equipment (including instruments and sensing devices) and shall conduct tests, emission or ambient, for such periods of time as may be necessary using methods approved by the Department.

3. ARM 17.8.106 Source Testing Protocol. The requirements of this rule apply to any emission source testing conducted by the Department, any source or other entity as required by any rule in this chapter, or any permit or order issued pursuant to this chapter, or the provisions of the Clean Air Act of Montana, 75-2-101, *et seq*., Montana Code Annotated (MCA).

   Flathead LFGE shall comply with the requirements contained in the Montana Source Test Protocol and Procedures Manual, including, but not limited to, using the proper test methods and supplying the required reports. A copy of the Montana Source Test Protocol and Procedures Manual is available from the Department upon request.

4. ARM 17.8.110 Malfunctions. (2) The Department must be notified promptly by telephone whenever a malfunction occurs that can be expected to create emissions in excess of any applicable emission limitation or to continue for a period greater than 4 hours.

5. ARM 17.8.111 Circumvention. (1) No person shall cause or permit the installation or use of any device or any means that, without resulting in reduction of the total amount of air contaminant emitted, conceals or dilutes an emission of air contaminant that would otherwise violate an air pollution control regulation. (2) No equipment that may produce emissions shall be operated or maintained in such a manner as to create a public nuisance.

B. ARM 17.8, Subchapter 2 – Ambient Air Quality, including, but not limited to the following:

1. ARM 17.8.204 Ambient Air Monitoring
2. ARM 17.8.210 Ambient Air Quality Standards for Sulfur Dioxide
3. ARM 17.8.211 Ambient Air Quality Standards for Nitrogen Dioxide
4. ARM 17.8.212 Ambient Air Quality Standards for Carbon Monoxide
5. ARM 17.8.213 Ambient Air Quality Standard for Ozone
6. ARM 17.8.214 Ambient Air Quality Standard for Hydrogen Sulfide
7. ARM 17.8.220 Ambient Air Quality Standard for Settled Particulate Matter
8. ARM 17.8.221 Ambient Air Quality Standard for Visibility
9. ARM 17.8.222 Ambient Air Quality Standard for Lead
10. ARM 17.8.223 Ambient Air Quality Standard for $PM_{10}$

Flathead LFGE must maintain compliance with the applicable ambient air quality standards.

C. ARM 17.8, Subchapter 3 – Emission Standards, including, but not limited to:

1. ARM 17.8.304 Visible Air Contaminants. This rule requires that no person may cause or authorize emissions to be discharged into the outdoor atmosphere from any source installed after November 23, 1968, that exhibit an opacity of 20% or greater averaged over 6 consecutive minutes.

2. ARM 17.8.308 Particulate Matter, Airborne. (1) This rule requires an opacity limitation of less than 20% for all fugitive emission sources and that reasonable precautions be taken to control emissions of airborne particulate matter.

3. ARM 17.8.309 Particulate Matter, Fuel Burning Equipment. This rule requires that no person shall cause, allow, or permit to be discharged into the atmosphere particulate matter caused by the combustion of fuel in excess of the amount determined by this rule.

4. ARM 17.8.310 Particulate Matter, Industrial Process. This rule requires that no person shall cause, allow, or permit to be discharged into the atmosphere particulate matter in excess of the amount set forth in this rule.

5. ARM 17.8.322 Sulfur Oxide Emissions--Sulfur in Fuel. This rule requires that no person shall burn liquid, solid, or gaseous fuel in excess of the amount set forth in this rule.

6. ARM 17.8.324 Hydrocarbon Emissions--Petroleum Products. (3) No person shall load or permit the loading of gasoline into any stationary tank with a capacity of 250 gallons or more from any tank truck or trailer, except through a permanent submerged fill pipe, unless such tank is equipped with a vapor loss control device as described in (1) of this rule.

7. ARM 17.8.340 Standard of Performance for New Stationary Sources and Emission Guidelines for Existing Sources. This rule incorporates, by reference, 40 CFR Part 60, Standards of Performance for New Stationary Sources (NSPS). This facility is not an NSPS affected source because it does not meet the definition of any NSPS subpart defined in 40 CFR Part 60.

D. ARM 17.8, Subchapter 5 – Air Quality Permit Application, Operation, and Open Burning Fees, including, but not limited to:

1. ARM 17.8.504 Air Quality Permit Application Fees. This rule requires that an applicant submit an air quality permit application fee concurrent with the submittal of an air quality permit application. A permit application is incomplete until the proper application fee is paid to the Department. Flathead LFGE submitted the appropriate permit application fee for the current permit action.

2. ARM 17.8.505 Air Quality Operation Fees. An annual air quality operation fee must, as a condition of continued operation, be submitted to the Department by each source of air contaminants holding an air quality permit (excluding an open burning permit) issued by the Department. The air quality operation fee is based on the actual or estimated actual amount of air pollutants emitted during the previous calendar year.

   An air quality operation fee is separate and distinct from an air quality permit application fee. The annual assessment and collection of the air quality operation fee, described above, shall take place on a calendar-year basis. The Department may insert into any final permit issued after the effective date of these rules, such conditions as may be necessary to require the payment of an air quality operation fee on a calendar-year basis, including provisions that prorate the required fee amount.

E. ARM 17.8, Subchapter 7 – Permit, Construction, and Operation of Air Contaminant Sources, including, but not limited to:

1. ARM 17.8.740 Definitions. This rule is a list of applicable definitions used in this chapter, unless indicated otherwise in a specific subchapter.

2. ARM 17.8.743 Montana Air Quality Permits--When Required. This rule requires a person to obtain an air quality permit or permit alteration to construct, alter, or use any air contaminant sources that have the potential to emit (PTE) greater than 25 tons per year of any pollutant. Flathead LFGE has a PTE greater than 25 tons per year of carbon monoxide (CO); therefore, an air quality permit is required.

3. ARM 17.8.744 Montana Air Quality Permits--General Exclusions. This rule identifies the activities that are not subject to the Montana Air Quality Permit program.

4. ARM 17.8.745 Montana Air Quality Permits--Exclusion for De Minimis Changes. This rule identifies the de minimis changes at permitted facilities that do not require a permit under the Montana Air Quality Permit Program.

5. ARM 17.8.748 New or Modified Emitting Units--Permit Application Requirements. (1) This rule requires that a permit application be submitted prior to installation, alteration, or use of a source. Flathead LFGE submitted the required permit application for the current permit action. (7) This rule requires that the applicant notify the public by means of legal publication in a newspaper of general circulation in the area affected by the application for a permit. Flathead LFGE submitted an affidavit of publication of public notice for the July 6, 2008 issue of *The Daily Inter Lake*, a newspaper of general circulation in the Town of Kalispell in Flathead County, as proof of compliance with the public notice requirements.

6. ARM 17.8.749 Conditions for Issuance or Denial of Permit. This rule requires that the permits issued by the Department must authorize the construction and operation of the facility or emitting unit subject to the conditions in the permit and the requirements of this subchapter. This rule also requires that the permit must contain any conditions necessary to assure compliance with the Federal Clean Air Act (FCAA), the Clean Air Act of Montana, and rules adopted under those acts.

7. ARM 17.8.752 Emission Control Requirements. This rule requires a source to install the maximum air pollution control capability that is technically practicable and economically feasible, except that BACT shall be utilized. The required BACT analysis is included in Section III of this permit analysis.

8. ARM 17.8.755 Inspection of Permit. This rule requires that air quality permits shall be made available for inspection by the Department at the location of the source.

9. ARM 17.8.756 Compliance with Other Requirements. This rule states that nothing in the permit shall be construed as relieving Flathead LFGE of the responsibility for complying with any applicable federal or Montana statute, rule, or standard, except as specifically provided in ARM 17.8.740, *et seq*.

10. ARM 17.8.760 Additional Review of Permit Applications. This rule describes the Department's responsibilities for processing permit applications and making permit decisions on those applications that require an environmental impact statement.

11. ARM 17.8.762 Duration of Permit. An air quality permit shall be valid until revoked or modified, as provided in this subchapter, except that a permit issued prior to construction of a new or altered source may contain a condition providing that the permit will expire unless construction is commenced within the time specified in the permit, which in no event may be less than 1 year after the permit is issued.

12. ARM 17.8.763 Revocation of Permit. An air quality permit may be revoked upon written request of the permittee, or for violations of any requirement of the Clean Air Act of Montana, rules adopted under the Clean Air Act of Montana, the FCAA, rules adopted under the FCAA, or any applicable requirement contained in the Montana State Implementation Plan (SIP).

13. ARM 17.8.764 Administrative Amendment to Permit. An air quality permit may be amended for changes in any applicable rules and standards adopted by the Board of Environmental Review (Board) or changed conditions of operation at a source or stack that do not result in an increase of emissions as a result of those changed conditions. The owner or operator of a facility may not increase the facility's emissions beyond permit limits unless the increase meets the criteria in ARM 17.8.745 for a de minimis change not requiring a permit, or unless the owner or operator applies for and receives another permit in accordance with ARM 17.8.748, ARM 17.8.749, ARM 17.8.752, ARM 17.8.755, and ARM 17.8.756, and with all applicable requirements in ARM Title 17, Chapter 8, Subchapters 8, 9, and 10.

14. ARM 17.8.765 Transfer of Permit. This rule states that an air quality permit may be transferred from one person to another if written notice of intent to transfer, including the names of the transferor and the transferee, is sent to the Department.

F. ARM 17.8, Subchapter 8 – Prevention of Significant Deterioration of Air Quality, including, but not limited to:

1. ARM 17.8.801 Definitions. This rule is a list of applicable definitions used in this subchapter.

2. ARM 17.8.818 Review of Major Stationary Sources and Major Modifications--Source Applicability and Exemptions. The requirements contained in ARM 17.8.819 through ARM 17.8.827 shall apply to any major stationary source and any major modification, with respect to each pollutant subject to regulation under the FCAA that it would emit, except as this subchapter would otherwise allow.

This facility is not a major stationary source because this facility is not a listed source and the facility's PTE is below 250 tons per year of any pollutant (excluding fugitive emissions). The LFGE facility will be located at Flathead County Solid Waste District's existing landfill, which operates under MAQP #2850-06. Flathead Electric Cooperative will lease a parcel of about 1.5 acres in size from Flathead County Solid Waste District for the LFGE facility. The 1.5 acre LFGE parcel is located within the landfill; thus, the adjacent land us in all directions is landfill operations. MAQP #2850-06 includes a permitted flare. Any LFG not burned in the Flathead LFGE facility will be routed to the flare.

G. ARM 17.8, Subchapter 12 – Operating Permit Program Applicability, including, but not limited to:

1. ARM 17.8.1201 Definitions. (23) Major Source under Section 7412 of the FCAA is defined as any source having:

a. PTE > 100 tons/year of any pollutant;

b. PTE > 10 tons/year of any one hazardous air pollutant (HAP), PTE > 25 tons/year of a combination of all HAPs, or lesser quantity as the Department may establish by rule; or

c. PTE > 70 tons/year of particulate matter with an aerodynamic diameter of 10 microns or less ($PM_{10}$) in a serious $PM_{10}$ nonattainment area.

2. ARM 17.8.1204 Air Quality Operating Permit Program. (1) Title V of the FCAA amendments of 1990 requires that all sources, as defined in ARM 17.8.1204(1), obtain a Title V Operating Permit. In reviewing and issuing Air Quality Permit #4245-00 for Flathead LFGE, the following conclusions were made:

   a. The facility's PTE is less than 100 tons/year for any pollutant.

   b. The facility's PTE is less than 10 tons/year for any one HAP and less than 25 tons/year for all HAPs.

   c. This source is not located in a serious $PM_{10}$ nonattainment area.

   d. This facility is not subject to any current NSPS.

   e. This facility is not subject to any current NESHAP standards.

   f. This source is not a Title IV affected source.

   g. This source is not an EPA designated Title V source.

   Based on these facts, the Department determined that Flathead LFGE will be a minor source of emissions as defined under Title V.

III. BACT Determination

A BACT determination is required for each new or altered source. Flathead LFGE shall install on the new or altered source the maximum air pollution control capability which is technically practicable and economically feasible, except that BACT shall be utilized.

A BACT analysis was submitted by Flathead LFGE in permit application #4245-00, addressing some available methods of controlling emissions from the reciprocating engine. The Department reviewed these methods, as well as previous BACT determinations. The following control options have been reviewed by the Department in order to make the following BACT determination.

CO BACT

This project is somewhat unique in that there are generally recognized issues related to the application of catalyst-based pollution control devices to devices combusting landfill gas. Specifically, add-on controls such as oxidation catalysts are not commonly used on landfill gas-fired combustion devices due to the fact that landfill gas contains contaminants that poison the catalyst materials, or at a minimum, significantly reduce the service life of the catalysts. The primary compound of concern is called siloxane, which is silicon based and present in landfill gas, which clogs the catalyst bed reducing the availability of sites where catalytic reaction can occur, and ultimately renders the catalyst inoperable. The Department is not aware of any successful installation of post combustion treatment technologies to landfill gas-fired engines.

As part of the review of this permit application, several recently issued permits were reviewed for landfill gas-fired engine projects. Recent CO BACT determinations for reciprocating engines range from 2.3 to 3.0 g/bhp-hr. Caterpillar guarantees a CO emission rate of 4.13 g/bhp-hr at 100 percent, 4.25 g/bhp-hr at 75 percent and 4.4 g/bhp-hr at 50 percent power output. Caterpillar expects a nominal CO emissions rate of 2.5 g/bhp-hr at all three power outputs. Caterpillar defines "nominal" as emissions during the first 100 hours of operation. A BACT/LAER analysis sets a CO standard of

2.75 g/bhp-hr. Flathead LFGE proposed a CO limit of 2.75 g/bhp-hr at 100 percent power output, and 3.0 g/bhp-hr at 50 percent power output on a 3 hour rolling average. Based on vendor guarantees with supporting information, and recently permitted sources with similar BACT analyses, CO BACT for reciprocating engines is therefore represented by these limits, combustor design and good combustion practices to minimize CO emissions.

$NO_x$ BACT

There is a direct tradeoff between $NO_x$ emissions and CO emissions. Lowering $NO_x$ emissions increases CO (and VOC) emissions, therefore, $NO_x$ is considered with CO when determining BACT limits. As part of the review of this permit application, several recently issued permits were reviewed for landfill gas-fired engine projects. Recent $NO_x$ BACT determinations for reciprocating engines range from 0.50 to 1.4 g/bhp-hr. Caterpillar, the manufacturer of the G3520C reciprocating engine, guarantees a $NO_s$ emission rate of 0.5 g/bhp-hr at 100 percent, 75 percent and 50 percent power output. A BACT/LAER analysis shows that 0.5 g/bhp-hr is typically for the type of engine proposed.

Based on vendor guarantees with supporting information, $NO_x$ BACT for reciprocating engines is therefore represented by combustor design and good combustion practices to minimize $NO_x$ emissions. In addition, the Department concurs that 0.5 g/bhp-hr on a 3-hour rolling average is appropriate as a BACT limit for $NO_x$.

VOC BACT

Caterpillar guarantees a VOC emission rate of 0.88 g/bhp-hr, 0.98 g/bhp-hr and 1.13 g/bhp-hr at 100 percent, 75 percent and 50 percent power outputs, respectively. A recent BACT/LAER analysis indicated a VOC limit of 0.7 g/bhp-hr. While 0.7 g/bhp-hr is below Caterpillar's guarantee, the applicant believes that 0.7 g/bhp-hr is achievable based on recent BACT analyses for similar sources. The facility proposed a limit of 0.7 g/bhp-hr as BACT for VOC emissions at 100 percent power output, and 0.9 g/bhp-hr at 50 percent power output on a 3-hour rolling average. The Department believes that the proposed limits along with good combustion practices constitute BACT for VOC emissions.

$SO_2$ BACT

Landfill gas contains hydrogen sulfide ($H_2S$). Upon combustion, the $H_2S$ oxidizes to sulfur dioxide ($SO_2$). The $SO_2$ emissions at the site will not change as a result of implementation of the LFGE project. The $SO_2$ emissions from the existing flare (permitted and operated by the Flathead County Solid Waste District existing landfill) and the proposed engine are identical for the same amount of fuel burned. Any excess fuel not burned in the engine would be routed to the Flathead County Solid Waste District landfill flare. Therefore, good combustion practices are considered BACT for $SO_2$.

**$PM_{10}$**

Flathead LFGE considered the following technology as control options:

- The use of low sulfur fuels that minimize particulate attributable to the carryover of inert material in the fuel;
- The use of low polluting processes such as high-performance combustors or burners to minimize the formation of unburned carbon in the combustion unit,;
- The use of filters to remove particles from the landfill gas before being introduced into the combustion units; and

- The use of particulate flue gas controls such as cyclones, fabric filters and electrostatic precipitators.

The facility evaluated the technical feasibility of flue gas particulate controls identified above and concluded that flue gas controls are not technically feasible. These conclusions were based on information showing these controls would have little or no effect on these emission units. The flue gas controls are typically used to control flue gas with relatively high grain loading. The Flathead LFGE project's flue gas concentrations are very low making these controls impractical.

However, prior to reaching the engine, the landfill gas will be processed through the following steps to remove moisture and particulate from the LFG:

- Inlet separator vessel with mesh pad filter;
- LFG pressurization;
- LFG cooling in an air-LFG heat exchanger;
- Outlet separator vessel with mesh pad filter; and
- Pre-engine coalescing filter.

This filtering system will employs a moisture separator with an internal mesh pad filter that will collect water droplets and some incoming particulate. In addition, the reciprocating engines will be equipped with coalescing filters designed to remove 99% of all water droplets and particulates greater than 1 micron. During the compression and chilling stages of landfill gas processing, water vapor is condensed and another water separator and coalescing filter is used, further removing particulate matter from the landfill gas.

USEPA's "Compilation of Air Emission Factors, Volume I: Stationary Point and Area Sources" (AP-42 Fifth Edition), Section 2.4 for Municipal Solid Waste Landfills, on Table No. 2.4-5, indicates that an emission rate of 48 pounds of particulate matter per $10^6$ dry standard cubic feet (dscf), can be expected for landfill gas fired internal combustion engines. The Caterpillar G3520C has a guaranteed heat rate of 7,339 Btu/hp-hr. The engine is rated at 2,233 bhp. The AP-42 emission rate is equivalent to:

2,233 bhp * 7,339 Btu/hp-hr – 16.39
16.39 Btu/hr / 1,012 Btu/$ft^3$ (methane) = 16,196 $ft^3$ per hour of methane
16,196 $ft^3$/hr * 8760 hours/year * 48 lbs/$10^6$ $ft^3$ = 6,810 lbs/year or 3.41 tons/year
16,196 $ft^3$/hr * 48 lbs/$10^6$ $ft^3$ * 453.6 g/lb / 2,233 hp = 0.16 g/bhp-hr

After reviewing the information supplied by the applicant, BACT/LAER Clearinghouses, and LFGE projects in other states, the Department determined that BACT for $PM_{10}$ for all combustion devices consists of filtering the incoming landfill gas and employing good combustion practices. In addition, a $PM_{10}$ limit of 0.1 g/bhp-hr on a 3-hr rolling average will be established for the Flathead Electric LFGE facility.

The control options selected have controls and control costs comparable to other recently permitted similar sources and are capable of achieving the appropriate emission standards.

IV. Emission Inventory

| | Tons/Year | | | | |
|---|---|---|---|---|---|
| | **$PM_{10}$** | **$NO_x$** | **CO** | **$SO_2$** | **VOC** |
| Caterpillar G3520C engine/generator (2,233 bhp) | 2.16 | 10.78 | 59.30 | 5.33 | 15.09 |

**$PM_{10}$**
2,233 bhp * 0.1 g/bhp-hr / 453.6 g/lb * 8,760 hours/year / 2,000 lb/ton = 2.16 tons/year

**$NO_x$**
2,233 bhp * 0.5 g/bhp-hr / 453.6 g/lb * 8,760 hours/year / 2,000 lb/ton = 10.78 tons/year

**CO**
2,233 bhp * 2.75 g/bhp-hr / 453.6 g/lb * 8,760 hours/year / 2,000 lb/ton = 59.30 tons/year

**VOC**
2,233 bhp * 0.70 g/bhp-hr / 453.6 g/lb * 8,760 hours/year / 2,000 lb/ton = 15.09 tons/year

**$SO_2$**
200 ppmv * 34.08 * 64.07/34.08 / (385.1 * $10^6$) * 610 scfm* 525,000 min/year / 2,000 lb/ton = 5.33 tons/year

V. Existing Air Quality

On July 1, 1987, the Environmental Protection Agency (EPA) promulgated new National Ambient Air Quality Standards (NAAQS) for $PM_{10}$. Due to exceedances of the national standards for $PM_{10}$, the cities of Kalispell (and the nearby Evergreen area), Columbia Falls, Butte, Whitefish, Libby, Missoula, and Thompson Falls were designated by EPA as nonattainment for $PM_{10}$. As a result of this designation, the EPA required the Department and the City-County Health Departments to submit $PM_{10}$ State Implementation Plans (SIP). The SIPs consisted of emission control plans that controlled fugitive dust emissions from roads, parking lots, construction, and demolition, since technical studies determined these sources to be the major contributors to $PM_{10}$ emissions.

The current permit action would minimally increase $PM_{10}$ emissions. Therefore, the Department believes the area will not be affected.

VI. Ambient Air Impact Analysis

In the view of the Department, the amount of controlled emissions generated by this project will not cause concentrations of any regulated pollutant in the ambient air that exceed any set ambient standard. Any potential impacts will be minimized by the conditions and limitations established in Permit #4245-00.

VII. Taking or Damaging Implication Analysis

As required by 2-10-105, MCA, the Department conducted the following private property taking and damaging assessment.

| YES | NO | |
|---|---|---|
| X | | 1. Does the action pertain to land or water management or environmental regulation affecting private real property or water rights? |
| | X | 2. Does the action result in either a permanent or indefinite physical occupation of private property? |
| | X | 3. Does the action deny a fundamental attribute of ownership? (ex.: right to exclude others, disposal of property) |
| | X | 4. Does the action deprive the owner of all economically viable uses of the property? |
| | X | 5. Does the action require a property owner to dedicate a portion of property or to grant an easement? [If no, go to (6)]. |
| | | 5a. Is there a reasonable, specific connection between the government requirement and legitimate state interests? |
| | | 5b. Is the government requirement roughly proportional to the impact of the proposed use of the property? |
| | X | 6. Does the action have a severe impact on the value of the property? (consider economic impact, investment-backed expectations, character of government action) |
| | X | 7. Does the action damage the property by causing some physical disturbance with respect to the property in excess of that sustained by the pubic generally? |
| | X | 7a. Is the impact of government action direct, peculiar, and significant? |
| | X | 7b. Has government action resulted in the property becoming practically inaccessible, waterlogged or flooded? |
| | X | 7c. Has government action lowered property values by more than 30% and necessitated the physical taking of adjacent property or property across a public way from the property in question? |
| | X | Takings or damaging implications? (Taking or damaging implications exist if YES is checked in response to question 1 and also to any one or more of the following questions: 2, 3, 4, 6, 7a, 7b, 7c; or if NO is checked in response to questions 5a or 5b; the shaded areas) |

Based on this analysis, the Department determined there are no taking or damaging implications associated with this permit action.

VIII. Environmental Assessment

An environmental assessment, required by the Montana Environmental Policy Act, was completed for this project. A copy is attached.

**DEPARTMENT OF ENVIRONMENTAL QUALITY**
**Permitting and Compliance Division**
**Air Resources Management Bureau**
**P.O. Box 200901, Helena, Montana 59620**
**(406) 444-3490**

## DRAFT ENVIRONMENTAL ASSESSMENT (EA)

*Issued To*: Flathead Electric LFGE Facility

*Air Quality Permit Number*: 4245-00

*Preliminary Determination Issued*: August 20, 2008
*Department Decision Issued*:
*Permit Final*:

1. *Legal Description of Site*: The Flathead LFGE facility would be located in Section 1, Township 29 North, Range 22 West in Flathead County, Montana. The facility would be located at the Flathead County Solid Waste District's existing landfill, located at 4098 Highway 93 North.

2. *Description of Project*: The project would incorporate a single Caterpillar G3520C engine/generator. The engine/generator would be fueled on LFG produced by, and collected at, the Flathead County Solid Waste District's landfill. If the LFG was not used as a fuel for the engine/generator, it would be destroyed in an existing enclosed flare owned by Flathead County Solid Waste District.

3. *Objectives of Project*: The purpose of the project would be to convert landfill gas to energy.

4. *Alternatives Considered*: In addition to the proposed action, the Department also considered the "no-action" alternative. The "no-action" alternative would deny issuance of the air quality preconstruction permit to the proposed facility. However, the Department does not consider the "no-action" alternative to be appropriate because Flathead LFGE demonstrated compliance with all applicable rules and regulations as required for permit issuance. Therefore, the "no-action" alternative was eliminated from further consideration.

5. *A Listing of Mitigation, Stipulations, and Other Controls*: A list of enforceable conditions, including a BACT analysis, would be included in Permit #4245-00.

6. *Regulatory Effects on Private Property*: The Department considered alternatives to the conditions imposed in this permit as part of the permit development. The Department determined that the permit conditions are reasonably necessary to ensure compliance with applicable requirements and demonstrate compliance with those requirements and do not unduly restrict private property rights.

*7. The following table summarizes the potential physical and biological effects of the proposed project on the human environment. The "no-action" alternative was discussed previously.*

| | | Major | Moderate | Minor | None | Unknown | Comments Included |
|---|---|---|---|---|---|---|---|
| A | Terrestrial and Aquatic Life and Habitats | | | X | | | Yes |
| B | Water Quality, Quantity, and Distribution | | | X | | | Yes |
| C | Geology and Soil Quality, Stability and Moisture | | | X | | | Yes |
| D | Vegetation Cover, Quantity, and Quality | | | X | | | Yes |
| E | Aesthetics | | | X | | | Yes |
| F | Air Quality | | | X | | | Yes |
| G | Unique Endangered, Fragile, or Limited Environmental Resources | | | | X | | Yes |
| H | Demands on Environmental Resource of Water, Air and Energy | | | X | | | Yes |
| I | Historical and Archaeological Sites | | | | X | | Yes |
| J | Cumulative and Secondary Impacts | | | | X | | Yes |

SUMMARY OF COMMENTS ON POTENTIAL PHYSICAL AND BIOLOGICAL EFFECTS: The following comments have been prepared by the Department.

A. Terrestrial and Aquatic Life and Habitats
B. Water Quality, Quantity and Distribution
C. Geology and Soil Quality, Stability and Moisture
D. Vegetation Cover, Quantity, and Quality

The Flathead LFGE facility would be considered a minor source of emissions and would result in a slight increase in $NO_x$, CO, VOC, $SO_2$, and $PM_{10}$. However, the facility would be located within the boundaries of an existing facility, and would encompass approximately 1.5 acres of the 80 acre site. Therefore, only minor effects on terrestrial and aquatic life and habitats, water quality, quantity and distribution, geology and soil quality, stability and moisture, and vegetation cover, quantity, and quality would be expected as a result of the proposed facility.

E. Aesthetics

The 2,233 Caterpillar engine/generator would be visible and would create additional noise in the area. However, the facility would be located within the boundaries of an existing landfill and encompass only 1.5 acres of the 80 acre site. In addition, noise would not exceed 80 decibels (dBA) at 21 feet from the facility and about 65 dBA at the landfill boundary. Therefore, only minor effects on aesthetics would be expected as a result of the proposed facility.

F. Air Quality

The air quality impacts from the facility would be minor because Permit #4245-00 would include conditions limiting emissions of regulated pollutants. The facility would be located within the boundaries of an existing landfill, and would encompass no more than 1.5 acres of the 80 acre property. In addition, the facility would be considered a minor source of air

pollution by industrial standards and would be located in an area where good air dispersion would occur. Therefore, air quality impacts would be minor.

G. Unique Endangered, Fragile, or Limited Environmental Resources
H. Demands on Environmental Resource of Water, Air and Energy
I. Historical and Archaeological Sites

The facility would be located within the boundaries of an existing landfill, and encompass no more than 1.5 acres of the 80 acre site. No known unique, endangered, fragile or limited environmental resources, or historical and archaeological sites are expected to be found in the area. The demands on environmental resources of water, air and energy would be minimal because the facility would be producing energy and would be a minor source of air pollutants by industrial standards. Therefore, there would be no impacts expected as a result of this project.

J. Cumulative and Secondary Impacts

The facility would be located at an existing landfill and would encompass no more than 1.5 acres of the 80 acre site.

*8. The following table summarizes the potential economic and social effects of the proposed project on the human environment. The "no-action" alternative was discussed previously.*

| | | Major | Moderate | Minor | None | Unknown | Comments Included |
|---|---|---|---|---|---|---|---|
| A | Social Structures and Mores | | | X | | | Yes |
| B | Cultural Uniqueness and Diversity | | | X | | | Yes |
| C | Local and State Tax Base and Tax Revenue | | | X | | | Yes |
| D | Agricultural or Industrial Production | | | X | | | Yes |
| E | Human Health | | | X | | | Yes |
| F | Access to and Quality of Recreational and Wilderness Activities | | | X | | | Yes |
| G | Quantity and Distribution of Employment | | | | X | | Yes |
| H | Distribution of Population | | | | X | | Yes |
| I | Demands for Government Services | | | X | | | Yes |
| J | Industrial and Commercial Activity | | | X | | | Yes |
| K | Locally Adopted Environmental Plans and Goals | | | | X | | Yes |
| L | Cumulative and Secondary Impacts | | | | X | | Yes |

SUMMARY OF COMMENTS ON POTENTIAL ECONOMIC AND SOCIAL EFFECTS: The following comments have been prepared by the Department.

A. Social Structures and Mores
B. Cultural Uniqueness and Diversity
C. Local and State Tax Base and Tax Revenue
D. Agricultural or Industrial Production

The facility would be constructed and operated within the boundaries of an existing landfill. However, the operations would encompass no more than 1.5 acres of the 80 acre site. The facility would be small by industrial standards and would have a relatively small amount of pollutants emitted as a result of the operations. Therefore, the facility would have minor impacts on social structures and mores, cultural uniqueness and diversity, local and state tax base and tax revenue, and agricultural or industrial production.

E. Human Health

The proposed project would result in minor impacts to human health because of the increase in air emissions discharged from the facility. The project, permitted by Permit #4245-00, would comply with all applicable air quality rules, regulations, and standards. These rules, regulations, and standards are designed to be protective of human health.

F. Access to and Quality of Recreational and Wilderness Activities

The proposed project would have no impact on access to recreational and wilderness activities because the facility would be located within the boundaries of an existing permitted. The quality of recreational and wilderness activities would have minor impacts because of the increase in air emissions from the facility. While deposition of particles would occur, the Department determined that, due to dispersion characteristics and conditions in Permit #4245-00, the chance of the proposed project impacting the quality of recreational and wilderness activity would be minor.

G. Quantity and Distribution of Employment
H. Distribution of Population

The proposed project would not affect quantity and distribution of employment, or distribution of population in the area because the facility is an existing gas plant and the proposed project would only create one new permanent employee and corresponding distribution of population. In addition, the proposed project would not have impacts that would cause a decrease in the distribution of population.

I. Demands for Government Services
J. Industrial and Commercial Activity
K. Locally Adopted Environmental Plans and Goals

The Department is not aware of any locally adopted environmental plans and goals that would be affected by issuing this permit. The state standards would protect the proposed site and the environment surrounding the site.

L. Cumulative and Secondary Impacts

Overall, the social and economic cumulative and secondary impacts from this project would be minor because the proposed project would take place at the existing facility. New businesses would not be drawn to the area and permanent jobs would not be created or lost due to the proposed project. Because no new employees would be hired for the proposed project, there would be no economic impacts from new employees.

Recommendation: No Environmental Impact Statement (EIS) is required.

The current permitting action is for the construction and operation of a landfill gas fuel to energy facility. Permit #4245-00 includes conditions and limitations to ensure the facility will operate in compliance with all applicable rules and regulations. In addition, there are no significant impacts associated with this proposal.

Other groups or agencies contacted or which may have overlapping jurisdiction: Montana Historical Society – State Historic Preservation Office, Natural Resource Information System – Montana Natural Heritage Program

Individuals or groups contributing to this EA: Department of Environmental Quality – Air Resources Management Bureau, Montana Historical Society – State Historic Preservation Office, Natural Resource Information System – Montana Natural Heritage Program

EA prepared by: Julie Merkel
Date: August 8, 2008